ABSTRACT

Losses are reduced in a current supply circuit including an inverter having a switching element. The dynamic losses in an IGBT element including a free wheeling diode are proportional to the product of turn-on losses and a switching frequency, and the static losses are proportional to the product of a current flowing through the IGBT element and a saturation voltage across a collector and an emitter of the IGBT element. When the breakdown voltage of the IGBT element is increased twice, the saturation voltage across a collector and an emitter does not reach twice as much. Therefore, the static losses can be reduced by increasing a voltage twice and reducing a current by half that are supplied to a load to attain the same power to supplied to the load, with the same dynamic losses.